



[Time: Three Hours]

[ Marks:80]

Note:

- 1) Question 1 is compulsory.
- 2) Solve any three questions out of the remaining questions

Q1

- (a) Discuss and compare various types of networks. 05
- (b) The size option field of an IP datagram is 20 bytes. What is the value of HLEN? What is the value in binary? 05
- (c) Compare connectionless and connection-oriented services. 05
- (d) The received string of bits is 110011001100. Is it acceptable? If so, what is the data bit sequence? Consider the divisor is 10101. 05

Q2 (a) What is routing in a network? Explain the shortest path routing protocol. 10

Q2 (b) Explain the different transmission media in networking. 10

Q3 (a) Explain OSI reference model and the services and functions of each layer. 10

Q3 (b) Construct Huffman code for the given symbols  $\{x_1, x_2, \dots, x_8\}$  with probabilities  $P(x) = \{0.07, 0.08, 0.04, 0.26, 0.14, 0.09, 0.07, 0.25\}$ . Find the coding efficiency. 10

Q4 (a) Explain TCP segment header format in detail. 10

Q4 (b) Explain ALOHA and Slotted ALOHA. 10

Q5 (a) What is congestion and what are the causes of congestion? Explain token bucket algorithm of congestion control. 10

Q5 (b) Explain CSMA/CD. 10

Q6 Write short notes on the following (any four): 20

- a. SMTP
- b. HDLC
- c. ARP, RARP
- d. Traditional Ethernet frame
- e. Hubs, switches, bridges